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destitute of beauty, and they are remarkable for an elegant head-dress.

The preservation of their roads demands their constant exertion, owing to frequent floods; but they are never in a satisfactory state.

There is a tolerable inn kept by Henry Martin at St. Maxime; those at Arèche and Hauteluce are very indifferent. The cot of Cyril Freyzon, at La Gîte, can shelter the traveller bent on crossing the passes of La Perrière, La Sauce, and the Plan de l'Estace; but Lavocat's châlet should be avoided.

XII.—*On the Volcanic Mountains of Hawaii, Sandwich Islands.*

By J. G. Sawkins, Esq.

Communicated by Sir Rod. I. Murchison.

Read, June 25, 1855.

There are four volcanic mountains in the island of Hawaii, viz., Kohala, Muna Kea, Hualalai, and Muna Loa. The decomposed state of the rock being greater on Kohala than on any other, and the total absence of black lava, lead me to believe that it is the oldest of the four. I also think that Muna Kea is next in age, and that Hualalai and Muna Loa are the most recent and of the same period.

The height of these mountains above the sea is estimated as follows:—

Kohala	about	9,800	feet.
Muna Kea	,,	13,842	,,
Hualalai	,,	11,020	,,
Muna Loa	,,	13,651	,,

I landed on the western side of the island at a place called Kawaihai, and crossed over to the eastern coast. This gave me an excellent opportunity of seeing the decomposing effects of the moist atmosphere on the old lavas of the more northern and older volcanoes, which are no doubt co-existent with the formation of the island.

The most remarkable features on the N.E. portion of the island are the immense cliffs of compact lava, separated by ravines, varying in depth from 200 to 2000 feet, over the sides of which a series of cascades fall between Niulii and Hilo (or Byron's Bay). To the S. of that bay the lava assumes quite a different appearance; the colour is black, and its structure like the slag of a furnace, having no definite form, though its cleavage is vertical.

This black or recent lava extends itself into the ocean, forming a shelf, as though it had spread out horizontally from the coast.

Occasionally holes of various dimensions appear, through which the sea is frequently seen to force itself.

There are many landslips on the south-western part of the island, like that at Hukena, but they have fallen so steep that anchorage is only obtained within a few yards of the shore ; others are on the N.E., where the shore is so abrupt and precipitous that a landing cannot be effected except in a calm.

One side of this island presents an extraordinary difference from the other, and affords instructive evidence of the cause of the decomposition of the lava. The W. and S.W. sides are arid, barren, and desolate ; while the N.E. and E. are moist and covered with the most luxuriant vegetation, with numerous water-courses.

It is on the latter sides where decomposition takes place. The moisture arises from the condensation of the clouds brought by the trade winds, which accumulate at an elevation of 8,000 to 11,000 feet above the sea, beyond which height their density seems to prevent their rising, until a portion of their watery contents is discharged.

Proceeding from Hilo to the crater of Kiluea, through Ooloa, are, at two miles to the west, two small craters, a few hundred feet above the sea. The lavas of these have been decomposed into fine red soil, the general characteristic of the Kohala deposits, which are covered with dense forests. But five miles farther on the whole aspect of the country changes, and bears evidence of the devastating effect of a more recent overflow from some of the upper craters, which encircle Muna Loa. Instead of the stately and dense forest which doubtless once existed here, there exist now only grass and ferns, which derive their nourishment from accumulated decomposed particles of lava, that fill the interstices of the yet undecomposed rock. These streams of lava on the mountain slope intersect the forests, and are so conspicuous that their courses can easily be traced to their origin, and give proof of their age, as compared with the modern lavas, until we rise to an elevation where vegetation disappears from other causes.

Ascending 32 miles on, with the gentle rise of 124 feet to the mile, we reach the crater of Kiluea (3970 feet), the mighty work of recent natural operations. The basalt or solidified lava forming the rim of the crater is more than three miles in diameter. Then there is a descent of about 70 feet to a plain covered with grey ashes ; again a descent with occasional fissures on the slope to a lower level, then a still further descent on earth of a light brown and yellow colour, and at last we arrive at a lake-like mass of hard blackish lava (992 feet), which, a short time previously, was in a state of fusion. On its surface there are many inequalities arising from shrinkage. It also exhibits diminutive volcanoes, from which bits of molten lava are thrown up, which cool on dropping, and form miniature mountains, the lava running down their sides, like tar on the side of a barrel. Here and there are deposits of crystallized sulphur, peroxide of iron, &c., with dense, hot vapour constantly arising from beneath. Occasionally the lava falls in, leaving large circular holes, from 20 to 80 feet deep, showing plainly that the crust in such places is only about 30 inches thick. A vertical cleavage is apparent, but it is not regularly prismatic or cubic.

The lava of the basin presents the appearance of black satin, and is so fragile as to crumble under the feet, and being dangerous, the guide, who generally possesses less courage or more prudence than others, dissuades the visitor from looking into the molten lake to see it boiling, cracking, and flowing from the N.E. to the S.W., opening its blood-red seams, and rolling from one side to the other, carrying the cooled grey surface beneath its liquid redness, like copper in an immense crucible. The earth quaked beneath us, and gusts of sulphurous vapour rose above our heads. The size of this lake of molten lava, concealed as it was by vapour, we could not estimate. The distance of the liquid lava from the edge on which we stood appeared to be about 100 feet beneath us, and it ebbed or flowed every instant towards the surface, and might at any moment rise beyond its present limit, even to the height it did in 1847, when it poured its currents down the mountain slope, and penetrated some old fissure or channel of a previous overflow, and another island, at some distance from the shore, was thrown up.

In 1851 there was an elevation of 150 feet in the centre of this crater, which extended over the greater part of it. There were also several small cones spirting forth bits of lava and hot vapour. On ascending the largest of these, the walls were found to be only 28 inches thick, forming a dome, and covered to the base with silicious ashes, sulphur, salts of iron, &c. It was curious to see the lighter silicious lava drawn out by the force of the wind into fine hair-like fibres (Pele's hair). The specific gravity of this substance was much lighter than the black lava, and resembling frothy obsidian: it floats on water. Some of the lava has colours on its surface, like peacock copper or sulphurous coal; some is granulated; some has long white lines through the black, which is the general colour of the new lava.

On examining the crater of Mokuoweoweo on the summit of Muna Loa, I found the country level for six miles. It then becomes very rugged, the whole surface presenting the same appearance as a field of broken ice, and the rock assumes every imaginable form, even to the coiled rope on a ship's deck. Occasionally there are upheavals apparently from explosion, throwing the crust of lava upwards in fractured cones, sometimes leaving an orifice in their midst. There is also evidence of under-currents of lava which have left hollows or tunnels on their course down the mountain. The falling in of the surface leaves open caverns, which are sometimes filled with snow, originally drifted by the trade wind into these hollows, and solidified into ice, at about 11,000 feet above the sea.

The ascent becomes more arduous as we proceed; climbing becomes difficult and dangerous; indeed such was the roughness of the surface that some time was consumed in finding a space whereon to rest.

Large beds of frothy obsidian are near the summit. At the uppermost crater on the edge of its vast area, 784 feet deep, without the sound of animated being, the eye rests on complete desolation; and one is led to reflect that such may have been the state of our earth at its creation.

From the summit of Muna Loa the low land is invisible. Man stands there seemingly apart from the beneficent and luxuriant provision God was pleased to prepare for him. No Paradise is there—all is desolation; but in descending we see how the influence of the atmosphere dissolves the substances contained in the lava, and forms a fertile soil.

To the S.E. the crater of Pohakuhanalie is connected with that of Mokuoweoweo, which is much deeper; its walls being nearly perpendicular, and exhibiting 92 layers or beds, unintercepted by dykes. S. of the last-named crater there is another, the lava of which was so hot at the time of my visit that we could not walk over it. We came therefore to the conclusion that this was the seat of eruption that had been noticed a few days before.

XIII.—*Account of the Proceedings of H. M. S. Enterprise from Behring Strait to Cambridge Bay.* By Capt. R. COLLINSON, R.N., F.R.G.S.

Communicated by Sir GEORGE BACK, R.N., F.R.G.S.

Read, June 25, 1855.

THE priority of discovery of the Prince of Wales Strait by Capt. M'Clure in 1850 and the researches of Dr. Rae upon Victoria Island have deprived the voyage of the Enterprise of much of its interest. Yet the fact of having penetrated farthest to the eastward and approached nearest to the spot reached by the Hecla in 1819, together with our extrication from the ice, and consequent opening of the sea between Point Barrow and the Mackenzie as a whale fishery, in conjunction with such geographical remarks as must transpire in the navigation of unknown seas,